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NEW-YORK TRIBUNE.

SCIENTIFIC CONVENTION AT NEW-HAVEN.

American Association for the Advancement of Science.

[Reported for The Tribune.]

FOURTH DAY....NEW-HAVEN, Thursday, Aug. 22, 1850

An interesting and important paper on the "Aurora Borealis" was read before the general session of the Association yesterday afternoon, by Prof. D. OLMSTED of Yale. The following is an abstract of the points constituting the theory which he advances:

THE LATE PERIODIC VISITATION OF THE AURORA BOREALIS.

Prof. Olmsted said the leading objects of this communication were, 1st, To establish the fact that we have just passed through an extraordinary period of Auroras, to which he would venture to give the name of Visitations, which commenced in 1827 and closed in 1848. 2d, To determine the characteristics by which these exhibitions of the Aurora differ from the ordinary exhibitions of the same phenomenon, and to place on record a full and accurate description of several of the most remarkable, as materials for comparison in future visitations. 3d, To establish, by an extensive collation of observations, the laws of the Aurora Borealis—4th, To determine the origin of the Aurora, and to assign the true causes of the phenomena. The Professor proceeded to demonstrate that during the period called a "Visitation," the Auroras greatly exceed the ordinary exhibitions of the meteor in numbers, in splendor, in peculiar combinations of forms, and in a progression which works a beginning, middle and end

The laws of the Aurora Borealis, as determined by an extensive induction of facts chiefly gathered from personal observations, the Professor showed to be the following, comprehending both such as are generally admitted to be the leading facts or laws, and such as are deemed somewhat new, or at least not universally received and established truths

1. That the Aurora of the first class usually *commences* near the end of evening twilight, in the form of a northern light, resembling the dawn; that it usually arrives at its *maximum* at all places, however differing in longitude, at the same part of the night, namely, from 10 to 11 o'clock, and more frequently a little before 11; and that Auroras of the highest order frequently continue all night, while those of an ordinary character commonly ended before midnight.

2. That a great Aurora is usually preceded by a large *bank*, or *cloud of a peculiar vapor*, differing in its nature from ordinary clouds, commonly exhibiting a milky appearance, but sometimes of a smoky hue, or the two mixed together; and that the extent and density of this auroral vapor, resting upon the northern horizon, form the best prognostic we have of the probable intensity of the exhibition which is to follow, comprising the material of which the successive forms of the Aurora are constituted.

3. That the auroral *waves*, when peculiarly grand, make their appearance later than the streams and arches, and usually later than the corona, continue to a later hour of the night, appear at a lower level than the streamers, and roll upward, in the direction of the streamers, toward the point of general concourse.

4. That auroral exhibitions of the higher order are commonly of *great extent*, spreading over no inconsiderable part of the earth's surface, and reaching to a great but variable height.

5. That auroras of the first class have three distinct forms of periodicity—a *diurnal* periodicity, commencing, arriving at the maximum, and ending at different hours of the night, as already asserted; an *annual* periodicity, rarely or never occurring in June, and the greatest number of the highest order clustering about November, these last bearing a striking resemblance to each other; and a *secular* periodicity, the most remarkable of all, recurring in great series which we have denominated "auroral visitations." That the visitations most marked and best defined occur at intervals of about 65 years, recuring from the middle of one period to the middle of the next period, and last from 20 to 22 years, making the interval from the end of one to the beginning of the next about 45 years.

6 That, while the forms of the Aurora usually appear to be under the control of *magnetic forces*, yet this is not always the case, since the arches do not always culminate in the magnetic meridian, nor do they always place themselves at right angles to the magnetic meridian, nor does the effect on the needle correspond to the different states of intensity of the Aurora

7. That the Aurora has remarkable *geographical* relations, belonging chiefly to the higher latitudes, and only in the great Visitations descending below the latitude of 40 degrees; but descending lower on the Western than on the Eastern Continent; and prevailing more in the Northern than in the Southern hemisphere.

These seven propositions being shown to be, in the present state of our knowledge, the Laws of the Aurora Borealis, the Professor proceeded to assign its true origin and the cause of its mysterious phenomena.

After the phenomena of thunder and lightning were first proved by Franklin to be caused by Electicity, it was taken for granted, almost without discussion, that the Aurora Borealis was produced by the same agent; and this hypothesis has still very numerous adherents. Prof Olmsted went on to show that the Aurora is *not* produced by Electricity; first, that it was unsafe to predicate an identity of origin for a resemblance between the Aurora and certain appearances of Electricity in passing through an exhauster tube, and that the resemblance itself is greatly overrated. Secondly, that such an origin is inconsistent with the great extent of the phenomenon. Thirdly, that the electrometors do not indicate the presence of an Aurora. Fourthly, that these exhibitions are scarcely known in the Equatorial regions where electricity is most abundant; and prevail most in the Polar regions, where thunder and lightning are unknown. Fifthly, that this cause is incompetent to account for the auroral vapor, the material of the Aurora itself. Finally, that electricity is inadequate to account for the periodicity of the Aurora, if not entirely inconsistent with the secular periodicity.

But *Magnetism* has more claim than Electrity to be considered as the true cause of the Aurora Borealis, since it is acknowledged that the forms and positions which the streamers, the arches and corona assume, are intimately related to Magnetism, and that the Magnetic needle itself confirms and establishes this relation. But this proves merely that the matter of the Aurora has magnetic properties, but decides nothing with respect to the origin of the Aurora, which is the principal thing to be accounted for; while Magnetism, like Electricity, is inadequate to account for the extent, for the light, for the motions, for the material, and especially for the periodicity of the Aurora.

Dissatisfied with the attempts which have been made to account for the origin or to explain the phenomena of the Aurora from either Electrity or Magnetism, or from any other cause of a terrestial nature, we next look to the planetary spaces and arrive at the conclusion that the origin is *cosmical*.—The Professor argued the cosmical origin of the Aurora; first, from the *extent* of the exhibitions, which is greater than could arise from any terrestrial emanations or atmospheric precipitations.—Secondly, from the *velocity* of the motions, which are too great for any terrestrial forces. Thirdly, from the occurrence of the different stages of an Aurora (the beginning, maximum and end) at the *same hour* of the night, in places differing widely in *longitude*, which indicates that successive portions of the earth [portions, in the diurnal rotation, come under the origin of the Aurora situated in space. Finally, from the periodicity of the exhibitions—the diurnal, which shows a relation to the position of the sun with respect to its position—the annual, which indicates a relation of the auroral body to the earth's orbit, and especially the secular, which implies a cycle, at the end of which the auroral body and the earth return to the same relative position in the Heavens, while the very existence of such a secular periodicity takes the phenomenon out of the pale of terrestrial and places it within the pale of astronomical causes. The Professor's theory also infers that the auroral body (whence the material of the aurora is derived) is a nebulous body of light, semi-transparent, inflammable and magnetic matter, revolving around the Sun; and that probably there are many such collections of nebulous matter diffused through the planery spaces. It may be remarked that there is, according to these views, a great analogy in the origin of the Aurora Borealis and of the Meteoric showers—a question which will be more thoroughly investigated.

Last evening we had the first evening session of the Convention, at the large Church in College-st. The house was well filled at an early hour. The occasion was a Lecture by Mr. E. GEO. SQUIER, our Chargé to Nicaragua, upon the Volcanic Phenomena of Central America and the Geographical and Topographical Features of Nicaragua. In consequence of the important nature of Mr. Squier's communication, together with the general interest manifested in the subject here by many who were unable to hear the Lecture, I transmit a verbatim report:

The Volcanoes of Central America, with Observations on the Geographical and Topographical Features of Nicaragua: BY E. GEO. SQUIER.

No equal extent of the American Continent, perhaps of the globe, possesses so many volcanoes, active and extinct, or exhibits so many traces of volcanic action, as Central America; that is to say, the region embraced between the Isthmus of Tehuantigeo and Panama, or Darien. In the words of an eminet traveler, the entire Pacific Coast of this remarkable country "bristles with volcanic cones," which form a conspicuous feature in every landscape, rising above the plains and undulating hills, and often from the edges of the great lakes, with the regularity and symetry of the pyramids. It is a matter of surprise and regret that, affording as it does, so excellent a field for studying the grand and interesting phenomena connected with volcanoes and earthquakes, this country has not more particularly attracted the attention of scientific men, and especially of those who ascribe to igneous and volcanic agency so important a part in the physical changes which our planet has undergone. Humboldt did not pass through Central America, although fully impressed with the importance of its geological and topographical investigation; a deficiency which he deplores in many places in his published researches. Nor am I aware that any but very partial and imperfect accounts have been given to the world of the volcanoes of this country, and those have been by persons claiming no consideration as scientific men. Recognizing fully my own deficiency in this respect, I should not think of venturing on the subject, except in the hope of directing the attention of competent persons anew to it, and thus contributing to supply the desideratum. And I may here observe that the difficulties and dangers which are popularly supposed to beset travelers in Central America resulting from an unsettled state of society and from tropical diseases and imperfect means of communication, are fanciful, or have been recently in great part obviated. The student will find few serious obstacles to his investigations, and if he possesses a just enthusiasm, without which he is no true student, he will find means to surmount those.

The time, too, is especially favorable to investigation on the part of our countrymen; for apart from the good feeling which pervades all classes towards us, down to the poorest Indian, the Governments of the various States are both willing and anxious to extend every possible facility to men of science who may visit the country, especially those versed in geology and mineralogy. Indeed, I have been both personally and officially urged to exert my influence to induce such to come there, and also authorized to assure them of a cordial welcome and all practicable assistance on the part of the authorities.

The *speedy* opening of regular steam communication with Nicaragua, by means of which the interior of the country may be reached in ten days from New York, will, I am sure, also contribute toward inducing our men of science to explore this almost virgin field.

The volcanoes of Central America are all situated on the Pacific coast; the eastern slope of the Continent consisting of broken mountain ranges, which exhibit few traces of volcanic action. In fact they occur almost in a night time, running due N. W. and S. E. commencing with the high volcano of Cartago in Costa Rica (14,000 feet high) from the summit of which both oceans are visible, to Cittaltepett, in the department of Vera Cruz, in Mexico. There are several hundred volcanic peaks and extinct craters on this line, the most remarkable of which are Cartago, Iraser, Turrialva, Barba and Vatos, in Costa Rica; Alrogade, Carro Pelas, Miriballes, Tenerio, Rincon de la Vieja, Orosi, Madeira, Ometepec, Tapetero, Solentinami, Morrobacho, Massya, or Nendivi, Managua, Momotombo, (6,500 feet high,) Las Pilas, Acosusco, Arota, Tellica, Santa Clara, El Viego (7,000 feet high,) Coseguina and Joltepec, in Nicaragua; El Tigre, Guanacause and Nacaome, in Honduras; Amapala or or Conchagua, San Salvador, San Miguel, San Vicente, Isalco, Paneon and Santa Ana, in San Salvador; Pacaya, Volcan de Agua, Volcan de Fuego, Incentro, Acatenango, Atitlan, Tosanselco, Sapotitlan, Amilpas, Quesaltenango and Soconusco in Guatimala. There are many others which are nameless, or of which the names are unknown. Some ten or twelve of those above named are said to be "Alior" (vivo)—that is to say, they throw out smoke and exhibit other evidences of vitality. But three or four, however, can be said to be active at present, of which Isalco, in San Salvador, is the most remarkable, having been formed within the last 80 years, and within the recollection of persons now living. This volcano, and that of Jorullo, in Mexico, described by Humboldt, are, I believe, the only ones which have originated on the Continent since the Discovery. It arose from the plain in 1770, and covers what was then a fine cattle hacienda or estate. The occupants on this estate were alarmed by subterraneous noises and shocks of earthquake about the end of 1769, which continued to increase in loudness and strength until the 23d of the February following, when the earth opened about half a mile from the dwellings on the estate, sending out lava, accompanied by fire and smoke. The inhabitants fled; but the vagueros, or herdsmen, who visited the estate daily, reported a constant increase in the smoke and flame, but that the ejection of lava was at times suspended, and vast quantities of ashes, cinders and stones sent out instead, forming an increasing cone around the cut or crater. This process was repeated for a long period, but for many years the volcano has thrown out no lava. It has, however remained in a state of constant eruption, the explosions occurring every sixteen minutes and a quarter, with a noise like the discharge of a Park of Artillery, accompanied by a dense smoke and a cloud of ashes and stones, which fall upon every side and add to the hight of the cone. It is now about 1,500 or 2,000 feet in hight, and I am informed by an intelligent West Indian gentleman, Dr. Drivon, who has known it for the past 25 years, that within that period it has increased about one-third. At some times the explosions are more violent than at others, and the ejected matter greater in amount; but it is said the discharges are always regular. With the wind in a favorable direction, an annoying and sometimes injurious quantity of fine ashes or powder is carried to the city of Lensonate, 12 miles distant.

The volcano of Jorullo rose, I believe, in a single night; but, as we have seen, Isalco is the result of long continued deposits, and it seems to me that most of the volcanoes of Central America, including some of the largest, have been formed in like manner. In fact I have been a personal witness of the origin of a new volcano which, if it does not meet a premature extinguishment, bids fair to add another high cone to those which now strew the great plain of Leon. This plain, the finest I have ever seen, lies between Lake Monagua (which has its outlet through Lake Nicaragua and the River San Juan into the Atlantic) and the Pacific. Here the Cordillerras are wholly interrupted, and the Almighty hand has smothed the way for the grandest enterprise which human daring has conceived and which human energy seems now on the eve of accomplishing, the opening of a Ship Canal between the two Oceans. Standing upon a moderately elevated point in this great plain, the traveler looks down upon one hand on the silvery waters of Monagua and upon the other on the broad Pacific, stretching far away to "Cattray and the Spice Islands." A narrow belt of land less than 60 feet higher than the Lake, alone, prevents Monagua from sending her waters in the Western rather than the Eastern [ocean—into the placid Pacific rather than the turbulent Atlantic. This plain is traversed by a succession of Volcanic cones from the gigantic Momotombo, standing boldly out into the Lake, to the memorable Coseguina, projecting its base not less boldly into the ocean. Fourteen distinct volcanoes occur within one hundred miles, on this line, all of which are vivid at the same time. They do not form a continuous range, but stand singly, the plain between them generally pursuing its original level. They have not been "thrust up," as the volcano of Jorullo seems to have been, elevating the strata around them; although it is not certain but the original volcanic force, being general in its action, raised up the whole plain to its present level. All these are surmounted by beds of lava, called by the natives *mal pais*, literally "bad country," extending in some cases for leagues in every direction. The lava current in places seems to have spread out in sheets, flowing elsewhere however in high and serpentine ridges resembling Cyclopean walls, often capriciously enclosing spaces of arable ground in which vegetation is luxuriant; these are called by the natives *corrales*, yards. Hot springs and openings in the ground emitting hot air, smoke and steam, called *infernales*, are common around the bases of these volcanoes. For large spaces the whole ground seems resting upon a boiling caldron, and is encrusted with mineral deposits.—Around some of these volcanoes, that is to say those having visible craters, are many smaller cones, of great regularity, composed of ashes, volcanic sand and triturated stones resembling septana. They seldom support any but a few dwarf trees and are covered with coarse grass. This grass when grown gives them a beautiful emerald appearance. In the dry season this color is exchanged for yellow, which after the annual burnings gives place to black.—They constitute with their changes very singular and striking features in the central American Landscape. On the 11th and 12th days of April last, rumbling sounds, resembling thunder were heard in the City of Leon, situated in the center of the plain I have described. They seemed to proceed from the direction of the volcanoes and were supposed to come from the great valcano of Momotombo, which often emits noises, and shows other symptoms of activity, beside sending out smoke. This volcano however, on this occasion exhibited no unusual indications. The sounds increased in loudness and frequency on the night of the twelfth and occasional tremors of the earth were felt as far as Leon, which near the mountains were quite violent, terrifying the inhabitants. Early on the morning of Sunday, the 13th, an orifice opened near the base of the long-extinguished volcances of Las Pilas, about 20 miles distant from Leon. The throes of the earth at the time of the outburst were very severe in the vicinity, resembling, from the accounts of the natives, a series of concussions. The precise point where the opening was made might be said to be in the plain; it was, however, somewhat elevated by the lava which had ages before flowed down from the volcano, and it was through this bed of lava that the eruption took place. No people reside within some miles of the spot, consequently I am not well informed concerning the earlier phenomena exhibited by the new volcano. It seems, however, that the outburst was attended by much flame, and that at first quantities of melted matter were ejected irregularly in every direction. Indeed, this was clearly the case as was shown upon my visit to the spot some days thereafter. For a wide distance around were scattered large flakes resembling freshly cast iron. This regular discharge continued only for a few hours, and was followed by a current of lava, which flowed down the slope of the land toward the West, in the form of a high ridge, rising above the tops of the trees and bearing down every thing which opposed its progress. While this flow continued, which it did for the remainder of the day, the earth was quiet, excepting only a very slight tremor, which was not felt beyond a few miles. Upon the 14th, however, the lava stopped flowing, and an entirely new mode of action followed. A series of eruptions commenced, each lasting about three minutes, succeeded by a pause of equal duration. Each eruption was accompanied by concussions of the earth, too slight, however, to be felt at Leon, attended also by an outburst of flame a hundred feet or more in hight; showers of red hot stones were also ejected with each eruption to the hight of several hundred feet. Most of these fell back in the mouth or crater, the rest falling outward and gradually building up a cone around it. By the attraction of this process the stones became more or less rounded, thus explaining a peculiarity in the volcanic stones already alluded to. These explosions continued uninterruptedly for seven days and could be accurately observed from Leon in the night. Upon the morning of the 22d, accompanied by Dr. J. W. Livingston, U. S. Consul for Leon, I set out to visit the spot No one had ventured near it, but we had no difficulty in persuading some *vageros* from the village of Arota to act as guides. We rode with difficulty over beds of lava, until within about a mile and a half of the place, proceeding thence on foot. In order to obtain a full view of the youthful volcano, we ascended a high naked ridge of Scoriae, entirely overlooking it. From this point it presented the appearance of an immense kettle, upturned, with a hole knocked in the bottom, forming the crater. From this, upon one side ran off the lava stream, yet fervent with heat, and sending off its tremendous radiations. The eruptions had ceased that morning, but a volume of smoke was still emitted, which the strong north east wing swept down in a trailing current along the tree tops.

The cone was patched over with yellow, the crystalized sulphur from the hot vapor passing up among the loose stones. The trees all around were stripped of their limbs, leaves and bark, resembling so many giant skeletons. Tempted by the quietude of the volcano, and anxious to inspect it more closely, in spite of the entreaties of our guides, we descended from our position, and going to the windward, scrambled over the intervening lava beds, through patches of thorny cactuses and agaves toward the cone. On all sides we found the flakes of melted matter which had been thrown out on the first day of the eruption, and which had moulded themselves over whatever they fell upon. We had no difficulty in reaching the base of the cone, the wind driving off the smoke and vapors to the leeward. It was perhaps a hundred and fifty or two hundred feet high, by two hundred yards in diameter at the base, and of great regularity of outline. It was made up entirely of stones, more or less rounded and of every size from one pound up to five hundred. No sound was heard when we reached it except a low rumbling noise, accompanied by a very slight tremulous motion. Anxious to examine it more closely, and to test the truth of the popular assertion that any marked disturbance near the volcanic rents is sure to bring on an eruption, we prepared to ascend. Fearing we might find the stones too much heated near the summit, I prepared myself with two staffs, as supports, and to save my hands. The Dr. disdained such appliances, and started without them. The ascent was very laborous, the stones rolling away beneath our feet and rattling down the sides. We however succeeded in almost reaching the summit, whence Dr. Livingston, who was a little in advance suddenly recoiled with an exclamation of pain, having all at once reached a layer of stones so hot as to blister his hands at the first touch. We paused for a moment, and I was looking to my footing, when I was startled by an exclamation of terror from my companion, who gave simultaneously an almost superhuman leap down the side. At the same instant a strange roar almost deafened me, there seemed to be a whirl of the atmosphere, and a sinking of the mass upon which I was standing. Quick as thought I glanced upward; the heavens were black with stones, and a thousand lightnings flashed among them. All this was in an instant, and with the quickness of thought I too was dashing down the side, reaching the bottom at the same instant with my companion and just in time to escape the stones, which fell in rattling torrents where we had stood a moment before. I need not say that in spite of spring cactuses and rugged beds of lava, we were not long in putting a respectable and safe distance between us and the flaming object of our curiosity. The eruption lasted for nearly an hour, interspersed with lulls, like long breathings. The noise was that of innumerable blast-furnaces in full operation, and the air was filled with projected and falling stones. The subsidence was almost as sudden as the outburst, and we waited several hours in vain for another eruption. Our guides assured us that another attempt to ascend, or any marked disturbance on the slope or to the vicinity, would be followed by an eruption, but we did not care to try the experiment.

From that period until I left Central America, I am not aware that there occurred more than one eruption, and that on the occasion of the falling of the first considerable shower of rain, on, I think, the 27th of May last. The discharges from this rent, consisting wholly of stones, may have been and probably were peculiar, for the volcanoes themselves and the cones surrounding them seem generally to have been made up of such stones interspersed through large quantities of ashes and scoriaceous sand, alternating with beds of lava.

Although believing that most of the volcanic cones have been formed in this manner, by gradual accumulations, yet the volcanoes which have shown the greatest energy, are low and irregular, and devoid of anything remarkable in their appearance. Such is the Volcano of Cozeguina in Nicaragua, the eruption of which in 1835 was one of the most terrible on record.

On the morning of the 20th of January of that year, several loud explosions were heard for a radius of a hundred leagues around this volcano, followed by the rising of an inky black cloud above it, through which darted tongues of flame resembling lightning. This cloud gradually spread outward, obscuring the sun, and shedding over everything a yellow, sickly light, and at the same time depositing a fine sand, which rendered respiration difficult and painful. This continued for two days, the obscuration becoming more and more dense, the sand falling more thickly, and the explosions becoming louder and more frequent. On the third day the explosions attained their maximum, and the darkness became intense. Sand continued to fall, and the people deserted their houses, fearing the roof would yield beneath the weight. This sand fell several inches deep at Leon, more than 100 miles distant. It fell in Jamaica, Vera Cruz and Santa Fé de Bogota, over an area of 1,500 miles in diameter. The noise of the explosions was heard nearly as far, and the Superintendent of Belize, 800 miles distant, mustered his troops under the impression that there was a naval action off the harbor. All Nature seemed overawed; the birds deserted the air, and the wild beasts their fastnesses, crouching, terror-stricken and harmless in the dwellings of men. The people for a hundred leagues grouped, dumb with horror, amid the thick darkness, bearing crosses on their shoulders and stones on their heads, in penitential debasement and dismay. Many believed the day of doom had come, and crowded to the tottering churches, where, in the pauses of the explosions, the voices of the priests were heard in solemn invocation to Heaven. The strongest lights were invisible at the distance of a few feet; and, to highten the terrors of the scene, occasional lightnings traversed the darkness, shedding a lurid glare over the scene. This continued for 43 hours, and then gradually passed away.

For some leagues around the Volcano, the sand and ashes had fallen to the depth of several feet. Of course the operations of the Volcano could only be known by the results. A crater had been opened, several miles in circumference, from which had flowed vast quantities of lava into the sea on one hand, and the Gulf of Fonseca on the other. The verdant sides of the mountain were now rough, burned and seamed, and covered with disrupted roots and fields of lava. The quantity of water injected was incredible in amount. I am informed by the Captain of a vessel which passed along the coast a few days thereafter, that the sea for fifty leagues was covered with floating masses of pumice, and that he sailed for a whole day through it, without being able to distinguish but here and there an open space of water.

The appearance of this mountain is now desolate beyond description. Not a trace of life appears upon its parched sides. Here and there are openings emitting steam, small jets of smoke and sulphurous vapors, and in some places the ground is swampy from thermal springs. It is said that the discharge of ashes, sand and lava was followed by a flow of water, and the story seems corroborated by the particular smoothness of some parts of the slope. The hight of this mountain is not, I think, more than 2,500 feet. The anniversary of the cessation of this eruption is celebrated in the most solemn manner throughout all Central America.

The volcano of San Miguel, in San Salvador, is a regular truncated cone, rising 8,000 feet above the plain. It emits a small plume of smoke from its top, but its eruptions, which are frequent take place near the base. The last of these occurred in 1848, when several vents were opened about 2,000 feet above the plain on its eastern slope. It was attended with none of those appalling phenomena which were observed at the eruption of Cozeguina, and lava only was ejected, with a little ashes, from the great crater. The lava currents radiate from this mountain for many leagues, in every direction, interposing vast barriers to the traveler in approaching it.

The volcano of San Salvador, near the city of that name, is remarkable for the extraordinary size of its crater, which is estimated by Dr. Weems, American Consul in Guatemala, to be 9 miles in circumference, sloping like an inverted cone to the depth of 5,000 feet—almost large enough to receive the entire volume of Vesuvius. A small lake is visible at the bottom. The volcanoes in the vicinity of the city of Guatemala are better known than any others in Central America chiefly in connection with the earthquake of 1773, which caused the abandonment of the city of Old Guatemala. This earthquake, however, does not seem to have been as violent as many others which have happened since. And the accounts which have been published of the earth opening and swallowing entire houses, vomiting fire, &c. are, as observed by a late writer, incorrect and absurd. And in copying the monkish accounts of the catastrophe, modern authors may as well add the other interesting particulars of devils being seen to ascend out of the earth where it yawned, to assist in pulling down the sacred edifices, and wooden images of the saints running away and beckoning the inhabitants to follow them, with other occurrences equally novel and surprising.

A number of very severe earthquakes have happened within the last few years. One occurred in Guatemala in 1830, nearly if not quite as severe as that of 1773. In February, 1831, and September, 1839, severe shocks were felt in San Salvador, and in 1841 in Costa Rica. The last nearly destroyed the City of Castago, which had previously suffered a similar catastrophe. May, 1844, was distinguished throughout Nicaragua by a series of earthquakes or shocks, occurring at regular intervals, over a period of several days. The City of Nicaragua suffered much, and the waters of the Lake were observed to rise and fall with the shocks.

Much might be said on the phenomena of earthquakes as they occur in this country. The shocks seem to be of two classes, the perpendicular, which are felt only in the vicinity of volcanoes, and the horizontal, which reach over wide tracts of country. The latter are very unequal; in some places being violent, and in others nearer their assumed source comparatively slight. The undulating movement seems to be only a modification of the horizontal or vibratory. Sometimes these motions are all combined, or rather succeed each other with great rapidity. Such was the case with the earthquake of October last, which I experienced, and of which I can speak more authoritatively. [Mr. Squier here read from an article descriptive of this earthquake, published in the *National Intelligencer* at Washington, and dated Leon, Dec. 26, 1849.]

There are many striking features in the Topography of Central America, which seem entirely due to volcanic agency. Those which have more particularly attracted my attention, are what are popularly denominated extinct craters, now partially filled with water, forming lakes without outlets or apparent sources of supply save the rains. Some of these occur on the mountain and hill ranges, and are surrounded by evidences of having been volcanic vents. But this is not always the case. I will take what is called the Lake of Masaga, as an instance. This is not less than ten or twelve miles in circumference, and is not far from 1,000 feet, perhaps more, below the general level of the country. The sides are sheer precipices of trachytic rocks, splintered and blistered and exhibiting every indication of having been exposed to the intensest heat. Yet if these were true craters, where are the lava, ashes and other materials which they have ejected? There are certainly none in their vicinity which have emanated from them—no traces of lava streams surrounding them, nor are their edges elevated above the general level. Upon one side of the particular one which I have mentioned rises the extinct volcano of Masaga or Nindiri, with its proper crater, whence have flowed vast quantities of lava, part of which, falling near the precipitous walls of the Lake, have quite filled it upon that side. Some of the lakes are more or less impregnated with saline materials, but others are perfectly fresh and abound in fish. The burned and blistered walls indicate, it appears to me, that they have not been caused by subsidence or the falling in of the earth or rock strata.

The great plain of Leon at its highest part is elevated something less than 200 feet above the sea; yet in the vicinity of the range of volcanoes which traverse it, beds of lava, 15 feet thick, have been found in digging wells at the depth of 75 feet Spanish baras, or about 210 feet, and this at a point not the highest of the plains, but according to my calculations but 130 feet above the ocean. Unless there is some great error in these data, and I can conceive of none, they would seem to prove that there has been a subsidence of the plain since the almost infinitely remote period when the bed of lava flowed upwards from the depths of the earth. I may mention that in the vicinity of the volcanoes, water is scarce, and can only be obtained by digging to great depths. The particular well which I refer to at a cattle estate, 18 miles north east of Leon, is upward of 300 feet in depth, the water pure, with no saline materials in solution.

Mr. Squier here observed that he should omit any further references to volcanoes, although there remained many facts of interest to be presented in order to submit, in compliance with request, some brief observations upon the geographical and typographical features of that part of Central America embraced in the State of Nicaragua, particularly as connected with the proposed great interoceanic canal. He, however, wished to say, once for all, that he had no prejudices in favor of one or the other proposed routes of communication across the continents, his only wish being that the *best* shall be decided upon and the grand enterprise carried out He did not appear as the advocate of one line of transit at the expense of the other, nor as the mouth-piece of any set of speculators. The subject of artificial communication between the oceans had, he said, attracted attention for more than 300 years, and upward of 100 books and memoirs had been written on the subject—most, however, based upon exceedingly imperfect data, collected from various and often conflicting and unreliable sources. The great problem connected with the subject, and that which all have esteemed as vital to the question of the communication, has been this: *Is the great chain of the Cordilleras interrupted at any point upon the great central Isthmus?* This question, observed Mr. S. I am enabled to answer in the affirmative. Between the great Basin of Nicaragua, in which are Lakes Managua and Nicaragua, and which is drained by the River San Juan, flowing into the Carribean sea—that is to say, between the western extremity of Lake Managua and the Pacific the Cordilleras are *wholly interrupted*, and we have only the great plains of Leon and Conejo, rising, for a distance of 3,000 yards, to an elevation of about 60 feet above the lake and 200 above the sea, and thence subsiding, in a gentle slope, to the ocean. It is through the Lake of Managua, and across this plain, either to the little port of Tamarinda or the fine port of Realejo, or else (and this is most probable) across the Llano del Conejo, into the magnificent Gulf Fonseca, that the proposed Canal must pass. It is true Lake Nicaragua approaches, at one or two points, to within about 15 miles of the Pacific, and it would seem that it might be easily connected with that ocean. But between the two is a ridge of land of considerable hight, across which no canal can ever be constructed, simply because no sufficient amount of water is to be obtained at or near the summit to supply even the *leakage* of such a work. And a direct cut, by which a supply might be obtained from the lake, would involve a tunnel, large enough for ships, of six or seven miles in length, beside immense and almost impossible cuttings for the remainder of the distance. This is sufficiently demonstrated by the surveys, or rather reconnoisance of Mr. Bailey.

It is said that a practicable route exists between Lake Nicaragua, by way of the river Sapoa, to the Bay of Salinas, a part of the Gulf of Papagayo.—But no authentic examination has ever been made of this line, and Mr. Squier expressed his doubts as to its practicability. He would not, however, presume to speak decisively, as he had not enjoyed an opportunity of examining it in person. He would, nevertheless, say that even if practicable the contending winds which prevail in this Gulf, and to which it has given the name of Papagayos, would prove a signal disadvantage to it. Beside, so far as communication with California and the Northern half of the Continent, as well as with the Sandwich Islands and China and the East Indies is concerned, entering the Ocean at this point would be eminently disadvantageous.

Mr. Squier continued by saying that a ship communication across the continent at this point, involved, in his estimation, not only a Canal from the great Nicaragua Basin to the Pacific, but also a Canal for the greater part, if not the whole of the distance from Lake Nicaragua to the Atlantic The river San Juan, the outlet of this Lake, although probably passing an equal if not greater amount of water with the Connecticut or Hudson rivers,—and although for, by far the greater part of its length, capable of being navigated by our largest river steamers, is yet, for reasons which he had presented in a recent communication, in the *Providence Journal*, inadequate, under any practicable improvement of being made navigable for ships,—and any Canal not admitting of the easy and rapid passing of the largest ships, would very imperfectly meet or subserve the great ends of its construction and of commerce. Small steamers, such as are used on the tributaries of the Mississippi, may now be run on the river; and, with some improvements at the various rapids, steamers of a larger class may be used.

It will therefore be necessary to cut a canal parallel to the river, from which the requisite supply of water may be easily drawn. The line would run upon the North bank of the stream, near the base of the hills which bound the valley on that side. It is possible the rivers might, by dredging, be used for a distance of 20 miles downward from the lake to the River Savalos, in which case this section of the canal would be shortened to 70, perhaps to 60 miles. Mr. Squier said that this part of the proposed line had hitherto been passed over with very little remark, on the assumption that here no difficulty existed, and that the river might easily be made to answer every desirable purpose; yet, in his estimation, it was by far the most difficult part of the whole enterprise. Not on the score of feasibility, but of labor and expense. The whole matter, however, resolved itself into a simple question of dollars and cents. It only required capital.

The great Lake of Nicaragua, 125 miles in length by 50 in breadth, although quite shallow at many points on the northern shore, is nevertheless of great general depth, varying from 6 to 60 fathoms, and may, without doubt, be made navigable for ships of the greatest draught. The only difficulties exist in approaching the shores at either extremity; but these may probably be obviated by pier work and dredging.

Between Lake Nicaragua and the superior lake of Managua is a nominal distance of 18 miles. But the connecting stream, called Rio Tipitapa, is, in fact, for an extent of 12 miles, an *estuary* of Lake Nicaragua, and for that distance may probably be so cleared out as to be made navigable. From the head of this estuary, at a point called San Pasquiel, to Lake Managua, a distance of 5 miles, there is a rise of about 25 feet.

The greater part of this rise is abrupt, at a point about a mile below the Lake, called the Falls of Tipitapa. Very litte water passes here except in the rainy season, and in the dry season the stream is sometimes wholly suspended. The rock is apparently a soft calcareous breccia, easily worked. A short section of canal is therefore indispensible here, extending from the Lake to the Falls, a distance of one mile. Below this to San Pasquiel, at the head of the estuary from Lake Nicaragua, the bed of the stream is deep, and the banks abrupt and high, forming a natural canal, which only needs proper dams and locks at its lower extremity to furnish a channel adequate to every purpose of navigation.

Lake Managua is a fine body of water, and of much larger size than has hitherto been represented. It is certainly not far from 50 or 60 miles in greatest length by 35 in width, and ranges from 2 to 10 and 15, and even 40 fathoms in depth. The scenery which borders it is unsurpassed in beauty and grandeur. Upon the northern and eastern shore, lifting their blue rugged peaks one above the other, are the mountains of Matagalpa merging into those of Legona, rich in metallic veins. Upon the south and west are broad and fertile slopes and level plains, covered with luxuriant verdure, and of almost unlimited productiveness. The volcano of Momotombo, like a giant wonder, stands out boldly into the lake, its bare and blackened summit, which no man has ever reached, covered with a light wreath of smoke, attesting the continued existence of those internal fires which have seamed its steep sides with burning floods, and which still send forth hot and sulphurous springs at its base. Within the lake itself rises the regular cone of Momotombita, so regular that it seems a work of art, covered with a dense forest, under the shadows and within the deep recesses of which, frayed by the storms of ages, stand the rude and frowning statues of the gods of aboriginal superstition, raised long before European feet trod the soil of America, and to which the mind of the christianized Indian still reverts with a mysterious reverence impossible to conceal.

Between the north-western extremity of this lake and the Pacific, are the great plains already mentioned. Three lines across this plain have been suggested: 1st, by the left shore of the lake to the small fork of the Tamarinda; 2d, by the same shore of the well known port of Realejo; and

☞ SEE EIGHTH PAGE. ☜

FROM CHAGRES AND CALIFORNIA.

Arrival of the Crescent City.

The Crescent City arrived out at Chagres in nine days, via Kingston from New-York, and left Chagres on Monday the 12th at 10 o'clock A. M. arrived at Kingston on Wednesday the 14th inst. at 7 o'clock P. M.; left Kingston on the evening of the 15th at 9 o'clock P. M. and arrived off Sandy Hook on Wednesday night, the 21st, at 11 o'clock P. M.

The Crescent City brings a large amount of gold dust in the hands of the passengers.

The steamer Falcon sailed for Havana on the morning of the 12th at 10 A. M.

The steamer Isthmus arrived at Panama from San Francisco on the 8th inst, having left on the 19th of July. She brought 60 passengers.

The steamer Northener sailed from Panama July 27th, and the Sarah Sands on the 31st. The Eudora arrived at Panama August 2.

The steamer Harvey Gleason was run up the Chagres river on her first trip. Parties who saw her express perfect confidence of her success.

On Sunday the 18th at 6 A. M. passed steamship Empire City, long. 72° 34' west, lat. 24° 32' north.

The following is a list of the Crescent City's passengers—103 in all:

FROM CHAGRES.

Com Thos Ap C Jones, U S N and 2 servants	Geo Allen	H Slade
Capt J S Williams, U S N	D T Brown	J L Wilson
Capt S P Hatch, U S Rifles	W H Norris	J S Swan
Lieut J K Duer, U S N	Capt D B Swan	L Pulsipher
Wm Gunnegle, U S N	Capt G H Montague	A H Sandford
J A Sherbourn, Commodore's Sec'y	Capt J Spinney	Edward Morey
Hon Geo Abernethy, Ex-Gov of Oregon, & lady	D T Tripp	D Gilmartin
Miss Abernethy	D Priestly	Edward Hayndes
Wm Abernethy	A Andre	J Leary
R Meachem & lady	Fred. Townsend	L Whitney
Miss Meachem	J W Stout	D Bucalen
Miss J Joyce	J Darling	S S Haynes
Mr Samuel & lady	A Howell	William Hawley
Miss Pares	Corns. Lawrence	C S Way
L Reynolds	T Warren	G Kittridge
Geo Trescot	L Beale	J Morton
E H Grimn	John Lemon	J W Metcalfe
G Q Colton	J Plume	J S Clute
W H Hughes	W W Young	W G Goldsmith
J D Selveira	A Gunthier	Charles Rogers
C G Curtis	W Berry	H Maher
	Chas Martin	R K Lee
	John Martin	Alex McLean
	M S Washburn	Wm. S Bowley
	J S Way	Geo W Thompson
	James Thompson	J R Baker
	Charles Maher	W Walker
	E Baker	William Lloyd
	P Dexter	W H Small
	Geo Ball	

FROM KINGSTON.

Don Juan de Francisco Martin, N Grenadian Minister to England, lady and servants	Don J de F Martin, Jr	Jno Lawrence and lady
Miss F Oresta Martin and serv	Gen Paredes, lady, 3 children and servants	Mrs Schase
	Saul Moss	Miss Hunt
	Peter Anderson	S Hannsford, Esq
		Henry Gibbs
		H H J Fick

We are indebted to Messrs. Gregory & Co's Express, Thompson & Hitchcock, Wall st., Agents, for files of all the San Francisco papers, in advance of all other communications. The advices are to the 17th of July, two days later than those received yesterday by the *Philadelphia*. We extract the following items:

Latest from the Trinity Region.

The arrival of the schooner Sierra Nevada, Capt. Edwards, on Monday last 36 hours from Humboldt, has put us in possession of interesting tidings from the Trinity Region.

It will be recollected that subsequent to the settlement made at Humboldt and Port Trinidad, a party of exploration proceeded on foot from the latter place up the coast to the distance of about thirty miles, where they came upon a river of large volume, emptying into the Pacific. A party of men, however, had already located at the mouth of this river; but they amicably joined forces for the purpose of mutual benefit and defense in the explorations of the main river, and its principal tributaries, which they immediately resolved upon.

The first attempt to penetrate the interior resulted disastrously in the death of one of the company, and the return of the remainder to the settlement at the mouth of the river. Our readers will recollect the particulars, as we gave a full history of the transaction at the time.

Not discouraged, however, by the failure of this attempt, the company resolutely set to work to carry out their original intention; and very soon another company started up the stream in boats. This time they met with no accidents of a serious character; and they pursued their investigations, until now they are able to present the most accurate sketch of that much talked of region we have hitherto seen. Mr. Ehrenberg, who came a passenger by the Sierra Nevada, has shown us a map embracing among other things the river with its tributaries, large and small, from which, together with the reliable information imparted, we draw the following conclusions in relation to the locality of certain streams which have so puzzled their seekers to find, or know when found.

The main stream, which for the last two or three months has been called sometimes the Trinity and sometimes the Chaste, (or Shasti) is neither, but the Klamath. The first branch of any magnitude on the south side, and rising in a south-east direction from its mouth, is the *Trinity*, upon which miners have been laboring the past Fall and Winter. As you pass up the main stream, gradually bending from the mouth of the Trinity until it stretches away in nearly a northerly direction, numbers of small creeks make into the river from the East, but none of moment except the Shasti.

Their conclusion that the principal stream was none other than the Klamath, was drawn from two or three facts that have much force. It stretches up into the region where the Klamath has been supposed to take its rise. The brig Arabian has explored the coast up to 42 50, without finding any stream answering to the size of the Klamath. The Willamette rises in latitude about 48, so that there is hardly a possibility that another large river should empty into the Pacific between the mouth of the Columbia and the point where the explorations of the Arabian ceased. In a few days we shall give Mr. Ehrenberg's reasons for this conclusion in his own words, when the public can judge for themselves.

The news brought down from the mines in that region is quite unexpected. Owing to the high stage of the water, which rendered it impossible to mine with any considerable degree of success, very many persons started north in the direction of the Shasti, some two months since. It is presumed, however, that they have struck upon a spot which promises to pay.

Most of those who were left behind on the Trinity, except such as had claims in the shape of damming operations, had left and gone over to the Klamath where they are now laboring with fair success.

The fact that gold has been found on both the Trinity and Klamath rivers in almost opposite directions, is evident that a large extent of country in that section contains more or less of the precious metal, how much, will doubtless be determined as soon as the falling of the water shall afford an opportunity to test the matter thoroughly.

[Pacific News, July 17.

Financial Resources of California.

It has been a matter of the profoundest gratification for us to know that, amid the elemental strife which has been raging among our Atlantic brethren concerning the admission of California into the Union, that the foundation of her financial prosperity has been laid upon a broad and permanent basis, and one too, not dependent upon the contingency whether she shall be admitted a few months earlier or later into the sisterhood of States.

The inquiry has frequently been made of us: what resources can the State rely upon to meet her present engagements and the current ex-